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10/804,549

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Che-Hang C. Ih

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11/08/2006

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EXAMINER

OCHOA, JUAN CARLOS

ART UNIT

PAPER NUMBER

2123

DATE MAILED: 11/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/804,549

Applicant(s)

IH, CHE-HANG C.

Examiner

Juan C. Ochoa

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received:

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1–24 are presented for examination.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 8–24 are rejected under 35 U.S.C. 102(b) as being anticipated by Hollars et al., SD/FAST User's Manual (SD/FAST User's Manual hereinafter).
4. As to claim 8, SD/FAST User's Manual discloses a method for modeling a structure deployed on a spacecraft (see page T–58, section T3.3, 1st paragraph, lines 6–9 and page T–48, Fig. T3–1) comprising: determining a geometric shape (see “the correct geometry ... must be supplied by the user” in page T–69, Summary section, 4th paragraph) that resembles the structure in a fully deployed configuration (see page T–60, section T3.4, lines 1–2); generating time functions (see “The three prescribed motion routines used to specify the joint axis prescribed motion” in page T–59, section T3.3.1, 1st paragraph) for a change in shape of at least one structural component of said structure, said change in shape occurring as said structure expands into said fully deployed configuration (see “hinge locations ... can be left as variables” in page T–69, next to last paragraph and page T–56, last paragraph); and calculating mass properties (see “body masses can be left as variables” in page T–69, next to last paragraph and page T–56, last paragraph) of said geometric shape as a function of said time functions.

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5. As to claim 9, SD/FAST User's Manual discloses a method wherein said structure comprises an antenna structure (see page T-60, section T3.4, lines 1-2).

6. As to claim 10, SD/FAST User's Manual discloses a method wherein said antenna structure comprises an L-band antenna (see page T-60, section T3.4, lines 1-2).

7. Claims 9 and 10 have been given a broad reasonable interpretation by the Examiner. The Examiner notes that the steps disclosed in (page T-60, section T3.4, lines 1-2) are functionally equivalent to the results produced by the steps expressly claimed in Applicant's dependent claims 2 and 3. Therefore, the "product" that is produced by performing the steps disclosed in dependent claims 9 and 10 is the functional equivalent of the "product" that is produced in (page T-60, section T3.4, lines 1-2). Although the "steps" by which the end result is different, the final result for the "steps" is identical.

8. As to claim 11, SD/FAST User's Manual discloses a method wherein said geometric shape comprises an elliptical cylindrical shell (see "the correct geometry ... must be supplied by the user" in page T-69, Summary section, 4th paragraph).

9. As to claim 12, SD/FAST User's Manual discloses a method wherein said geometric shape is taken from the group consisting of spherical, cylindrical and elliptical shapes (see "the correct geometry ... must be supplied by the user" in page T-69, Summary section, 4th paragraph).

10. Claims 11 and 12 have been given a broad reasonable interpretation by the Examiner. The Examiner notes that the steps disclosed in (page T-69, Summary

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section, 4th paragraph) are functionally equivalent to the results produced by the steps expressly claimed in Applicant's dependent claims 11 and 12. Therefore, the "product" that is produced by performing the steps disclosed in dependent claims 11 and 12 is the functional equivalent of the "product" that is produced in (page T-69, Summary section, 4th paragraph). Although the "steps" by which the end result is different, the final result for the "steps" is identical.

11. As to claim 13, SD/FAST User's Manual discloses a method wherein said calculating comprises calculating the rotational and translation variation of a center of mass of said geometric shape (see "sensor() routine models the camera azimuth and elevation angle sensors" in page T-62, section T3.5.1, 1st paragraph, lines 1-3).

12. As to claim 14, SD/FAST User's Manual discloses a method wherein said structural component comprises a plurality of truss members configured to support a mesh-like screen, wherein at least one of said truss members comprises a variable length and wherein at least one of said truss members changes orientation relative to said other truss members (see page T-60, section 3.4, lines 1-2).

13. As to claim 15, SD/FAST User's Manual discloses a method for modeling a structure deployed on a spacecraft (see page T-58, section T3.3, 1st paragraph, lines 6-9 and page T-48, Fig. T3-1) comprising: generating time functions (see "The three prescribed motion routines used to specify the joint axis prescribed motion" in page T-59, section T3.3.1, 1st paragraph) for a structural component located on a periphery of an antenna structure as said structural component varies from a first length to a second length (see page T-60, section T3.4.1, lines 1-3) and as said structural component

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varies between a first orientation and a second orientation (see page T-69, next to last paragraph and page T-56, last paragraph); and calculating mass properties (see "body masses can be left as variables" in page T-69, next to last paragraph and page T-56, last paragraph) of an elliptical cylindrical shell (see "the correct geometry ... must be supplied by the user" in page T-69, Summary section, 4th paragraph) as a function of said time functions.

14. As to claim 16, SD/FAST User's Manual discloses a method wherein said antenna structure comprises an L-band antenna (see page T-60, section T3.4, lines 1-2).

15. Claim 16 has been given a broad reasonable interpretation by the Examiner. The Examiner notes that the steps disclosed in (page T-60, section T3.4, lines 1-2) are functionally equivalent to the results produced by the steps expressly claimed in Applicant's dependent claim 16. Therefore, the "product" that is produced by performing the steps disclosed in dependent claim 16 is the functional equivalent of the "product" that is produced in (page T-60, section T3.4, lines 1-2). Although the "steps" by which the end result is different, the final result for the "steps" is identical.

16. As to claim 17, SD/FAST User's Manual discloses a method wherein said calculating comprises calculating the rotational and translation variation of a center of mass of said elliptical cylindrical shell (see "sensor() routine models the camera azimuth and elevation angle sensors" in page T-62, section T3.5.1, 1st paragraph, lines 1-3).

17. As to claim 18, SD/FAST User's Manual discloses a method for modeling an expandable structure deployed on a spacecraft (see page T-58, section T3.3, 1st

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paragraph, lines 6–9 and page T–48, Fig. T3–1) comprising: determining a geometric shape (see “the correct geometry ... must be supplied by the user” in page T–69, Summary section, 4th paragraph) that resembles the expandable structure in a fully expanded configuration (see page T–60, section T3.4, lines 1–2); generating time functions (see “The three prescribed motion routines used to specify the joint axis prescribed motion” in page T–59, section T3.3.1, 1st paragraph) for a length of a structural component of said expandable structure (see “hinge locations ... can be left as variables” in page T–69, next to last paragraph and page T–56, last paragraph), said length configured to vary (see page T–60, section T3.4.1, lines 1–3) as said expandable structure expands; and calculating mass properties (see “body masses can be left as variables” in page T–69, next to last paragraph and page T–56, last paragraph) of said geometric shape as a function of said time functions for said length.

18. As to claim 19, SD/FAST User’s Manual discloses a method wherein said expandable structure comprises an antenna structure (see page T–60, section T3.4, lines 1–2).

19. As to claim 20, SD/FAST User’s Manual discloses a method wherein said antenna structure comprises an L-band antenna (see page T–60, section T3.4, lines 1–2).

20. Claim 20 has been given a broad reasonable interpretation by the Examiner. The Examiner notes that the steps disclosed in (page T–60, section T3.4, lines 1–2) are functionally equivalent to the results produced by the steps expressly claimed in Applicant’s dependent claim 20. Therefore, the “product” that is produced by performing

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the steps disclosed in dependent claim 20 is the functional equivalent of the "product" that is produced in (page T-60, section T3.4, lines 1-2). Although the "steps" by which the end result is different, the final result for the "steps" is identical.

21. As to claim 21, SD/FAST User's Manual discloses a method wherein said geometric shape comprises an elliptical cylindrical shell (see "the correct geometry ... must be supplied by the user" in page T-69, Summary section, 4th paragraph).

22. As to claim 22, SD/FAST User's Manual discloses a method wherein said geometric shape is taken from the group consisting of spherical, cylindrical and elliptical shapes (see "the correct geometry ... must be supplied by the user" in page T-69, Summary section, 4th paragraph).

23. Claims 21 and 22 have been given a broad reasonable interpretation by the Examiner. The Examiner notes that the steps disclosed in (page T-69, Summary section, 4th paragraph) are functionally equivalent to the results produced by the steps expressly claimed in Applicant's dependent claims 21 and 22. Therefore, the "product" that is produced by performing the steps disclosed in dependent claims 21 and 22 is the functional equivalent of the "product" that is produced in (page T-69, Summary section, 4th paragraph). Although the "steps" by which the end result is different, the final result for the "steps" is identical.

24. As to claim 23, SD/FAST User's Manual discloses a method wherein said calculating comprises calculating the rotational and translation variation of a center of mass of said geometric shape (see "sensor() routine models the camera azimuth and elevation angle sensors" in page T-62, section T3.5.1, 1st paragraph, lines 1-3).

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25. As to claim 24, SD/FAST User's Manual discloses a method wherein said structural component comprises a plurality of truss members configured to support a mesh-like screen, wherein at least one of said truss members comprises a variable length and wherein at least one of said truss members changes orientation relative to said other truss members (see page T-60, section 3.4, lines 1-2).

Claim Rejections - 35 USC § 103

26. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

27. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

28. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over SD/FAST User's Manual taken in view of Michael William Sayers, (Sayers hereinafter), Symbolic Computer Methods To Automatically Formulate Vehicle Simulation Codes.

29. As to claim 1, SD/FAST User's Manual discloses a method for modeling a structure deployed on a spacecraft (see page T-58, section T3.3, 1st paragraph, lines

6–9 and page T–48, Fig. T3–1) comprising: selecting a representative geometric shape (see “the correct geometry ... must be supplied by the user” in page T–69, Summary section, 4th paragraph) which resembles a deployed structure (see page T–60, section T3.4, lines 1–2); and generating time-varying mass properties (see “body masses can be left as variables” in page T–69, next to last paragraph and page T–56, last paragraph) of said geometric shape as a function of a physical parameter of said deployed structure (see “The three prescribed motion routines used to specify the joint axis prescribed motion” in page T–59, section T3.3.1, 1st paragraph).

30. While SD/FAST User's Manual discloses modeling a structure deployed on a spacecraft, SD/FAST User's Manual fails to disclose the deployed structure describing the degree of the deployment as one body.

31. Sayers discloses the deployed structure (See “A spacecraft model with 10 degrees of freedom is described in the SD/FAST Users Manual” in page 204, 2nd paragraph, lines 1–2) describing the degree of the deployment as one body (see “five rigid bodies: a main body W and four antennas” and “hinge points for the four antennas” in page 213). Examiner notes that Sayers is collapsing antennas and their hinges to single bodies.

32. SD/FAST User's Manual and Sayers are analogous art because they are both related to multi–body spacecraft models.

33. Therefore, it would have been obvious to one of ordinary skill in this art at the time of invention by applicant to utilize the single body of Sayers in the method of SD/FAST User's Manual because Sayers develops models and computer simulations of

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mechanical systems composed of rigid bodies and massless force- and torque-producing elements and their motions (see page 1, lines 1–3), and as a result, Sayers reports the following improvements over his prior art: a) automatic generation of highly efficient simulation codes, which incorporate realistically modelled components, that are correct, properly documented, and reasonably easy to use and b) an interface with the analyst that permits immediate evaluation of expressions involving scalars, vectors, points, and bodies (see page 1, next to last paragraph).

34. As to claim 2, SD/FAST User's Manual discloses a method wherein said deployed structure comprises a flexible large reflector (see page T–60, section T3.4, lines 1–2).

35. As to claim 3, SD/FAST User's Manual discloses a method wherein said flexible large reflector comprises an L-band antenna (see page T–60, section T3.4, lines 1–2).

36. Claims 2 and 3 have been given a broad reasonable interpretation by the Examiner. The Examiner notes that the steps disclosed in (page T–60, section T3.4, lines 1–2) are functionally equivalent to the results produced by the steps expressly claimed in Applicant's dependent claims 2 and 3. Therefore, the "product" that is produced by performing the steps disclosed in dependent claims 2 and 3 is the functional equivalent of the "product" that is produced in (page T–60, section T3.4, lines 1–2). Although the "steps" by which the end result is different, the final result for the "steps" is identical.

37. As to claim 4, SD/FAST User's Manual discloses a method wherein said geometric shape is taken from the group consisting of spherical, cylindrical and elliptical

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shapes (see “the correct geometry ... must be supplied by the user” in page T–69, Summary section, 4th paragraph).

38. Claim 4 has been given a broad reasonable interpretation by the Examiner. The Examiner notes that the steps disclosed in (page T–69, Summary section, 4th paragraph) are functionally equivalent to the results produced by the steps expressly claimed in Applicant's dependent claim 4. Therefore, the “product” that is produced by performing the steps disclosed in dependent claim 4 is the functional equivalent of the “product” that is produced in (page T–69, Summary section, 4th paragraph). Although the “steps” by which the end result is different, the final result for the “steps” is identical.

39. As to claim 5, SD/FAST User's Manual discloses a method wherein said generating comprises calculating the rotational and translation variation of a center of mass of said deployed structure as one body (see “sensor() routine models the camera azimuth and elevation angle sensors” in page T–62, section T3.5.1, 1st paragraph, lines 1–3).

40. As to claim 6, SD/FAST User's Manual discloses a method wherein said physical parameter of said deployed structure comprises at least one mechanical member having a variable length (see page T–60, section T3.4.1, lines 1–3).

41. As to claim 7, SD/FAST User's Manual discloses a method wherein said physical parameter of said deployed structure comprises at least one mechanical member, which has a variable orientation relative to other mechanical members of said deployed structure. (see “The outputs are ... a combined attitude/attitude rate error signal for the

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1-2-3 Euler angles describing the bus attitude" in page T-62, section T3.5.1, 1st paragraph, lines 3-last).

Conclusion

42. Examiner would like to point out that any reference to specific figures, columns and lines should not be considered limiting in any way, the entire reference is considered to provide disclosure relating to the claimed invention.

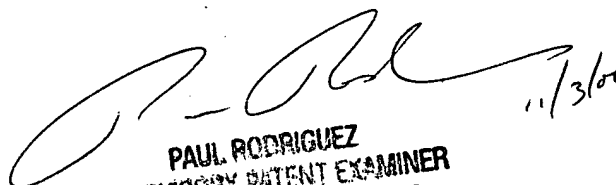
43. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan C. Ochoa whose telephone number is (571) 272-2625. The examiner can normally be reached on 7:30AM - 4:00 PM.

44. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on (571) 272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

45. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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*** 11/1/06



11/3/06
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